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Original Research Paper

Pathology

A STUDY OF THE HISTOMORPHOLOGICAL SPECTRUM OF INTERFACE DERMATITIS AT A TERTIARY CENTRE

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ABSTRACT

Background: Interface dermatitis includes diseases in which the primary pathology involves the dermo-epidermal junction. The common histological changes include basal cell vacuolization, apoptotic keratinocytes (Civatte bodies), and inflammatory infiltration around interface along with secondary changes of the epidermis and papillary dermis. The aim of the present study is to analyze dermal and epidermal changes in various lesions involving interface and to analyze age and sex distribution in lesions involving interface. **Material And Methods:** The study was a retrospective study of 50 cases, clinically diagnosed to have dermatoses in the department of dermatology at a tertiary center. A skin punch biopsy was done, fixed in formalin and sent for routine histopathological processing. All biopsies were stained with H&E and histomorphological diagnosis was made. **Result:** A total of 50 cases of interface dermatitis were studied. The most common age range was between 21-40 years with a female preponderance. Majority of the cases were of Lichen Planus and its variants with Classical lichen planus being the most common entity. Vacuolar basal cell degeneration was the most common epidermal change seen in 82% of cases along with dermo-epidermal junction inflammatory infiltrate as the most common dermal change seen in all studied cases. **Conclusion:** There are many differential diagnoses of lesions involving dermo-epidermal junction. So histomorphological study has been found to be the gold standard for early and accurate diagnosis of various lesions of interface dermatitis which helps for timely treatment.

KEYWORDS : Interface dermatitis, Civatte bodies, Lichen planus, Basal cell vacuolization

INTRODUCTION:

Interface dermatitis is a condition that involves the "interface" (the dermo-epidermal junction) as the primary pathology. The basal layer of the epidermis, the dermo-epidermal junction, the papillary dermis, and the adventitial dermis around the adnexal structures form the interface. These components of the interface act as a single anatomical and physiological unit and any alteration in any of its components leads to interface dermatitis.[1]

The typical primary changes seen in Interface dermatitis include basal cell vacuolization, apoptotic keratinocytes, and obscuring of the dermo-epidermal junction by lymphocytes.

The interface reaction is described as obscuring the dermo-epidermal junction by ingress of inflammatory cells (lymphocytes). The density of the inflammatory infiltrate varies from pauci-inflammatory to dense band–like "lichenoid infiltrate" depending on the type and stage of ID.[2]

Secondary changes seen in the epidermis range from epidermal atrophy to hyperkeratosis, hypergranulosis, and acanthosis. Moreover, melanophages and melanin incontinence associated with ID can be observed within the papillary dermis.

Major interface dermatoses include Lichen planus (LP)and its variants, lichenoid drug eruptions (LDE), fixed drug eruptions (FDE), erythema multiforme (EM), lupus erythematosus (LE), dermatomyositis (DM), graft versus host disease (GVHD), lichen striatus and pityriasis lichenoides.[4]

Interface dermatitis is a broad terminology used for all the lesions having clinical features and histological features of epidermal basal cell damage and extensive mononuclear cell infiltration in the papillary dermis, all these lesions are also known as lichenoid dermatosis or" Lichenoid tissue reaction" (LTR). [5,6]

Basal cell damage leading to cell death and/or vacuolar changes (liquefactive degeneration) is a common and important similarity between these disorders. In lichen planus, cell-mediated cytotoxicity is the main mechanism of pathogenesis due to predominant T cell infiltrate.[7]

Various factors leading to cell-mediated reactions include mechanical trauma, systemic drugs, contact sensitivity, and infective agents including some viruses.[8]

Need for the study-

The term interface dermatitis includes a number of clinically diverse, poorly understood and relatively uncommon inflammatory skin diseases linked together by the presence of a pattern of common histopathological elements showing very minute differences in each of them. Hence an in-depth understanding of the various epidermal and dermal changes in ID remains an indispensable tool for the precise diagnosis of interface dermatitis. This in turn helps in predicting the course of the disease and planning optimal management. Hence this study was undertaken with the objective of understanding and interpreting these subtle histological changes which aids in better clinical management of the patient.

MATERIALS AND METHODS:

A retrospective study was conducted in the Pathology department of our hospital for a period of 2 years from January 2021 to December 2022 after taking permission from Institutional Ethical Committee. A total of 50 patients diagnosed clinically as dermatoses were included in the study. All cases which showed interface changes secondary to infective or neoplastic etiology were excluded from the present study. Four mm punch biopsies were taken from representative lesions after taking informed consent and sent to the histopathology lab.

All biopsies were fixed in 10% buffered formalin, processed and stained with hematoxylin and eosin stain.

Various epidermal and dermal features were noted, analyzed and reported.

The data was collected and tabulated in Microsoft Excel sheet. Analysis was done in percentages and proportions.

RESULT:

The present study was a retrospective assessment of 50 cases clinically diagnosed as dermatoses and subjected to skin biopsy over a period of two years (Jan 2021 – Dec 2022).

Table 2 - Sex wise distribution of interface dermatitis cases (n=50)

Histopathological Diagnosis	Male	Female	Total
Classical Lichen Planus	4	12	16
Lichen planus pigmentosus	2	0	2
Lichen Planopilaris	1	1	2
Oral Lichen planus	2	1	3
Discoid lupus erythematous	4	10	14
Erythema Multiforme	1	2	3
Pityriasis lichenoid chronica	0	2	2
Lichen simplex chronicus	2	2	4
Lichenoid Drug eruption	3	1	4
Total	19	31	50

Of the 50 patients, 19 (38%) and 31 (62%) were male and female respectively, thereby showing a female preponderance.

Table 1 - Age wise distribution of interface dermatitis cases (n=50)

Histopathological Diagnosis	Age Group (in years)								
	0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	Total
Classical Lichen Planus	4	2	5	3			1	1	16
Lichen planus pigmentosus					1	1			2
Lichen Planopilaris				1	1				2
Oral Lichen planus	1	1		1					3
Discoid lupus erythematous			3	1	2	4	2	2	14
Erythema Multiforme			1	2					3
Pityriasis lichenoid chronica	1	1							2
Lichen simplex chronicus				1	1	2			4
Lichenoid Drug eruption					3	1			4
Total	6	4	9	9	8	8	3	3	50

The peak incidence was seen equally in the age group of 21-30 years and 31-40 years; each comprising 9/50 cases (18%). Maximum number of cases in both age groups were diagnosed as Classical lichen planus. 14 cases were above the age group of 50 years. Out of these, maximum cases were comprised of Discoid lupus erythematosus i.e. 8 cases, 2 cases each of Lichen planus and Lichen simplex chronicus, one case of Lichen planus pigmentosus and Drug-induced lichenoid reaction each. The least number of cases were seen in the age group 61 & above. The youngest case was a 5year female child diagnosed to have oral lichen planus and the oldest case was a 78-year male patient who had discoid lupus erythematosus.

Table 3 - Distribution of different types of interface dermatitis (ID) (n=50)

Histopathological Diagnosis	No. of cases	Percent of cases
Classical Lichen Planus	16	32
Lichen planus pigmentosus	2	4
Lichen Planopilaris	2	4
Oral Lichen planus	3	6
Discoid lupus erythematous	14	28
Erythema Multiforme	3	6
Pityriasis lichenoid chronica	2	4
Lichen simplex chronicus	4	8
Lichenoid Drug eruption	4	8
Total	50	100

Of the 50 cases, the most common lesion found was Lichen planus and its variants forming 23 cases (46.0%). Lichen planus variants included Lichen planus pigmentosus, Lichen simplex chronicus and Oral Lichen Planus. The next most common lesion was Discoid lupus erythematosus comprising of 14 cases (28.0 %), followed by Lichen simplex chronicus and Lichenoid drug eruption. Three cases each of Oral lichen planus and Erythema multiforme whereas two cases each of Lichen planopilaris. Lichenoid planus pigmentosus and Pityriasis lichenoid chronica were also seen.

Table 4 - Histopathological changes in epidermis and dermis in various Interface dermatitis lesions (n=50)

Epidermis	Frequency	Percent of cases
Hyperkeratosis	38	76
Parakeratosis	06	12
Follicular plugging	14	28
Acanthosis	37	74
Atrophy	20	40
Spongiosis	10	20
Hypergranulosis	28	56
Vacuolar basal cell degeneration	41	82
Civatte bodies	11	22
Elongated rete ridges	08	16
Max-Joseph spaces	06	12
Dermis		
Band-like inflammatory infiltration at dermo-epidermal junction	21	42
Inflammatory infiltrate around the dermo-epidermal junction	50	100
Perivascular inflammatory infiltrate	35	70
Peri-adnexal Inflammatory infiltrate	16	32
Pigment incontinence	35	70
Melanophages	10	20

The spectrum of various histomorphological changes in the epidermis and dermis was also studied in all 50 cases. Epidermal changes included parakeratosis, hyperkeratosis, acanthosis, hypergranulosis, spongiosis, saw-toothed rete ridges, Civatte bodies, liquefactive degeneration of basal layer, follicular plugging, atrophy and Max-Joseph spaces. Dermal changes included band-like infiltration at the dermo-epidermal junction along with perivascular and periadneaxal inflammatory infiltrate and pigment incontinence.

DISCUSSION:

Interface dermatitis (ID) is defined as an inflammatory skin disease in which the junction between the papillary dermis and the epidermis is obscured. Interface dermatitis encompasses multiple clinical entities with diverse histological features.

In the present study, a total of 50 cases were analyzed which clinically presented as interface dermatitis. Most patients belonged to the age group of 21-40 years (36%). This is comparable with the findings of Sehgal et al [9] (11-40 years) and Hegde et al[6] (21-50). However, Mahesh and co-authors in their study reported majority of cases in a younger age group (1-30 yrs.)[10]. This wide variation is because of multiple different sub-entities, which come under the same umbrella term interface dermatoses.

A female preponderance is noted in this study with a female-to-male ratio of 1:1.63 i.e, 62% females and 38% males which is in concordance with the study of Kumar et al (57.78%)[10],

Hegde et al (57.6%)[6] and Pawar et al (59.9)[11].

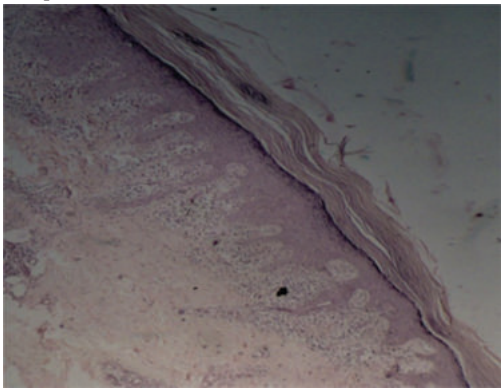
As Interface dermatitis has varying clinical appearances, clinico-histological correlation is crucial for optimum prognosis, treatment, and clinical management. The present study aimed to study histopathological changes in conditions presenting primarily as ID. In our study, majority (46%) of the cases were of lichen planus and its variants, followed by DLE and Lichenoid drug eruption. Among LP and its variants; classical lichen planus was the most common entity. This is in concordance with the studies done by Kumar et al[10], Chauhan et al[11] and Dixit et al[12].

Table 5 - Comparison of various histomorphological findings

S. No.	Histopathological Findings	Present study (%)	Vaishnavi R. Batchu et al[13] (%)	Chauhan et al[11] (%)
1	Hyperkeratosis	76	72.1	71.21
2	Parakeratosis	12	7.0	16.66
3	Hypergranulosis	56	67.44	65.15
4	Acanthosis	74	67.44	60.6
5	Civatte bodies	22	44.2	25.25
6	Vacuolar basal cell degeneration	82	97.7	74.24
7	Melanin incontinence	70	90.7	63.63
8	Follicular plugging	28	23.3	7.57
9	Band-like inflammatory infiltration at dermo-epidermal junction	42	-	-
10	Inflammatory infiltrate around dermo-epidermal junction	100	83.7	48.48
11	Perivascular inflammatory infiltrate	70	58.13	60.66
12	Peri-adnexal Inflammatory infiltrate	32	20.9	36.36

As seen in Table 4 & 5, common epidermal changes in the study included hyperkeratosis, hypergranulosis, acanthosis and basal cell vacuolation, wherein basal cell vacuolation (n = 41 [82%]) and hyperkeratosis (n = 38 [76%]) were predominantly observed. This is in concordance with the studies done by Vaishnavi R. Batchu et al[13] and Chauhan et al [11]. Civatte bodies are apoptotic bodies of the keratinocytes in the basal layer. These bodies were seen in 22 % of cases which is in concordance with the study done by Kumar et al[10] and Francis et al [15].

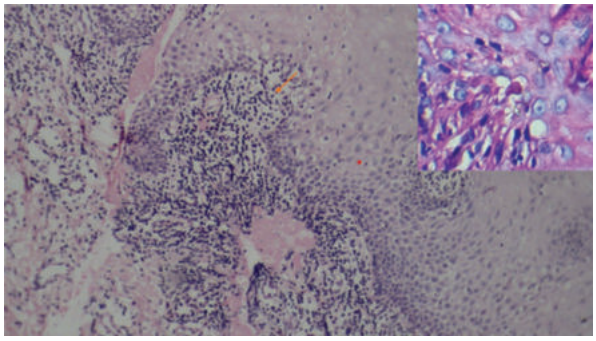
Band-like inflammatory infiltrates deposited around the dermo-epidermal junction is seen in 42% of studied cases which is an important characteristic feature of interface dermatitis. Inflammatory infiltrate around dermo-epidermal junction seen in all the cases in our study which is similar to studies by Kumar et al [11](93.3%) and Francis et al[15](100%).



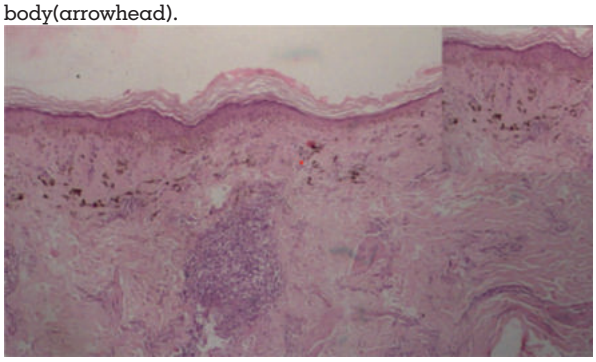
Classical Lichen planus showing hyperkeratosis, acanthosis, saw-toothed rete ridges and dense lymphocytic infiltrate at the dermo-epidermal junction (Fig 1-H&E, ×100)

Melanin incontinence is seen in 70% of cases which is similar to the study done by Chauhan et al[11] whereas it is seen in 90.7% of cases of the study done by Vaishnavi R. Batchu et al[13]. Reportedly, the degree of incontinence is higher in disorders with ID than in other diseases.

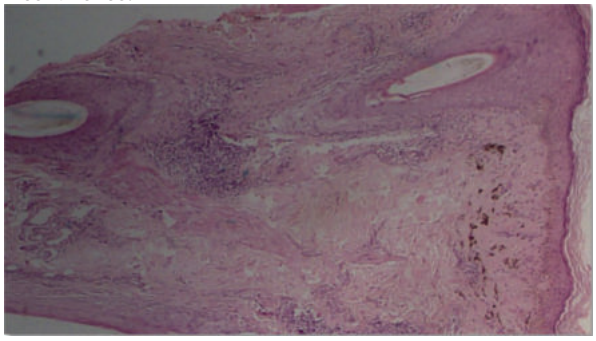
This could be attributed to melanogenesis stimulation, keratinocyte annihilation, and flawed transfer of melanin in ID.[4]



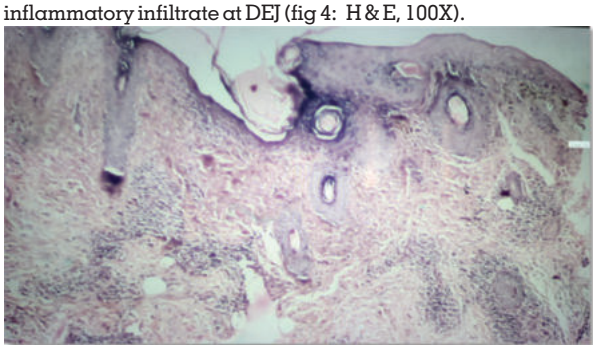
Classical Lichen Planus seen showing basal vacuolar degeneration, Lymphomononuclear infiltrate at DEJ (arrowhead) (Fig 2 - H & E, 400X). Inset shows civatte body(arrowhead).



Lichen planus pigmentosus showing mild hyperkeratosis and lymphocytic infiltrate in the dermis along with plenty of melanin incontinence (Fig 3- H&E 100x) Inset show melanin incontinence.

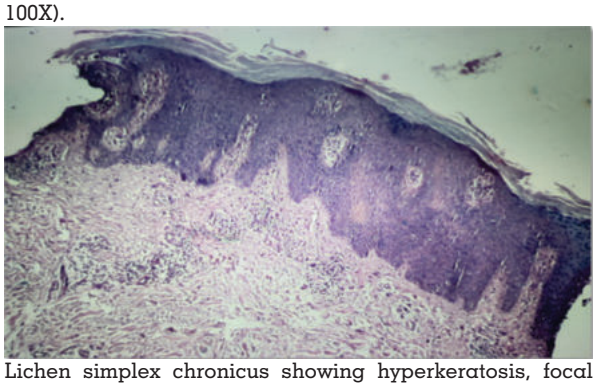


Lichen planopilaris showing lichenoid infiltrate in the perifollicular region with hydropic basal layer degeneration, inflammatory infiltrate at DEJ (fig 4: H & E, 100X).

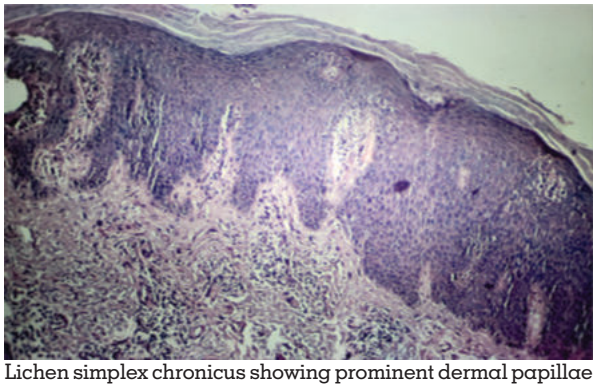


Discoid lupus erythematosus showing dilated and plugged

follicular ostia, superficial and deep perivascular and periadnexal lymphocytic infiltrate and fibrosis (Fig 7: H & E, 100X).



Lichen simplex chronicus showing hyperkeratosis, focal parakeratosis, a thickened granular layer and marked acanthosis. (Fig 5: H & E, 100X).



Lichen simplex chronicus showing prominent dermal papillae with vertically oriented collagen bundles in the superficial dermis. (Fig 6: H & E, 400X)

CONCLUSION:

There are many differential diagnoses of lesions involving dermo-epidermal junction which can be cured by the collaboration of dermatologists and pathologists. So histomorphological study along with clinical history has been found to be the gold standard for early and accurate diagnosis of various lesions of interface dermatitis which helps for timely treatment.

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Conflicts of interest:- There are no conflicts of interest.

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